



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/661,873

09/12/2003

Edgar Voelkl

068062.0167

8968

31625

7590

03/24/2008

BAKER BOTTS L.L.P.

PATENT DEPARTMENT

98 SAN JACINTO BLVD., SUITE 1500

AUSTIN, TX 78701-4039

EXAMINER

PATEL, JAYESH A

ART UNIT

PAPER NUMBER

2624

MAIL DATE

DELIVERY MODE

03/24/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/661,873	Applicant(s) VOELKL, EDGAR	
	Examiner JAYESH A. PATEL	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 1-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 18-47 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. In response to applicant's arguments that Zach fails to teach, either expressly or inherently, all of the elements of the claimed embodiment of the invention. Specifically, Zach fails to teach at least **"comparing the modified complex image with the second complex image,"** as recited in Claim 18, the Examiner disagrees. Zach discloses in fig 2 the modified complex images as being over-focused image and under-focused images of the focused image. The images are than Fourier transformed and than inverse transformed to determine the differences. This is clearly a comparing step performed by Zach as claimed in Claim 18. This is explained in (Col 5 Lines 50-61). Zach further discloses **"comparing the modified complex image with the second complex image,"** at (Col 4 Lines 49-54) where the differences are obtained showing the comparison. Zach further discloses in the abstract that the differences are obtained. Applicant further argues that Zach fails to suggest a method for detecting differences between complex images comprising **"comparing high frequency components of the transformed complex image with high frequency components of the second complex image,"** as recited by Claim 26, the examiner disagrees. Zach discloses in abstract that the **"brightness profiles"** are determined which shows that the high frequency components are present in the images and they are compared with each other in the inverse or

reverse transformed images to obtain the differences. Zach further discloses the spectrum components at **(Col 4 Lines 26)** which show that the spectrum means groups of frequencies including the high frequency components. All the Images made of Low and High frequencies and the fourier transforming the frequencies yields the intensity profiles. Applicant further argues that Zach also fails to disclose **"a system for detecting differences between complex images, comprising processing resources operable to "compare the modified complex image with the second complex image,"** as recited by Claim 30, the examiner disagrees. Zach in Fig 1 discloses a scanning electron microscope **(See Fig 1 and Col 5 Lines 30-31)** which is a system to process images using fourier transforms. Zach further discloses that the "Fourier and necessary mathematical transforms are performed" which requires a processor and it is well known to one of ordinary skill in the art as disclosed at **(Col 3 Lines 30-34)**. Applicant further argues that Zach fails to teach or suggest a method for detecting differences between complex images comprising **"correcting the aberration value difference by... comparing the modified first complex image with the second complex image in a high frequency range,"** as recited by Claim 38, the examiner disagrees. Zach discloses in abstract a method of determining geometrical-optical aberrations-- and the image aberration being determined from the differences shows "correcting the aberration value difference by... comparing the modified first complex image with the second complex image in a high frequency range,". Zach further disclose at **(Col 2 Lines**

33-35) where the differences of the profiles of the probes are used to determine the image aberrations shows "correcting the aberration value difference by... comparing the modified first complex image with the second complex image in a high frequency range," as recited in Claim 38.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000. Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 18-20, 24-26, 30-32, 38-41 are rejected under 35 U.S.C. 102(e) as being anticipated by Zach (US 6858844) hereafter Zach.

1. Regarding Claim 18, Zach discloses a method for detecting differences (**Fig 2**) between complex images, comprising: acquiring a first complex image (**Element 6**) and a second complex image (**Elements 6a and 6b**), the first and second complex images including similar features (**image of an object A**); selecting a plurality of aberration values (**measurement values of the sections to the left and right of the center at Col 3 Lines 5-13**) for the first complex image from an anticipated aberration range (**over-focused and under-focused**); computing an aberration function for each of the selected aberration values (**Col 3 lines 14-17, Col 4 Lines 18-22 and Col 5 Lines 1-8**); iteratively (**the process being repeated with an over-focused and an under-focused beam in abstract**) modifying the first complex image by each of the aberration functions; comparing the modified complex image with the second complex image (**focused with under-focused and focused with over-focused**); and determining an aberration correction value by selecting the aberration value that yields the smallest difference between the modified complex image and the second complex image in (**abstract, Col 2 Lines 30-35, Col 3 Lines 14-29 and Col 4 Lines 18-22**). The difference in the images that yields the sharpest image is the correct aberration value.

2. Regarding Claim 19, Zach discloses the method of Claim 18, further

comprising performing a Fourier transform on the first complex image such that the first complex image is modified in a frequency domain (**Fig 2 element 7**).

3. Regarding Claim 20, Zach discloses the method of Claim 19, further comprising performing an inverse Fourier transform on the modified complex image before comparing the modified complex image with the second complex image (**Fig 2 Elements 5 and 5a**). The inverse transformed images are then compared (**difference image**) to obtain the correct aberration value (**setting**) at (**Col 3 Lines 11-18 and 37-38**).

4. Regarding Claim 24, Zach discloses the method of Claim 18, wherein the anticipated aberration range includes a minimum aberration value (**under-focused**) and a maximum aberration value (**over-focused**) at (**Col 3 Lines 11-13 and Col 4 Lines 18-22**)

5. Regarding Claim 25, Zach discloses the method of Claim 18, wherein the aberration value comprises a focus value at (**Col 3 Lines 11-13 and Col 4 Lines 18-22**). The respective aberration values at the under-focused and over-focused image settings comprise focus values.

6. Regarding Claim 26, see the explanation of Claim 18 and (**Fig 2**).

7. Claim 30 is a corresponding system claim of the Claim 18, therefore see the explanation of Claim 18.

8. Claim 31 is a corresponding system claim of the Claim 19, therefore see the explanation of Claim 19.

9. Claim 32 is a corresponding system claim of the Claim 20, therefore see the explanation of Claim 20.

10. Regarding Claim 38, see the explanation of Claim 18 and See **(Fig 2)**.

11. Regarding Claim 39, Zach discloses the method of Claim 38, further comprising: selecting a plurality of aberration values for the first complex image from an anticipated aberration range **(Image 6a and 6b)**; and computing the aberration function for each of the aberration values and **(Col 3 lines 14-17, Col 4 Lines 18-22 and Col 5 Lines 1-8)**.

12. Regarding Claim 40, Zach disclose the method of Claim 38, further comprising performing a Fourier transform on the first complex image such that the first complex image is modified in a frequency domain **(Element 7 Fig 2)**.

13. Regarding Claim 41, Zach discloses the method of Claim 40, further comprising performing an inverse Fourier transform on the modified first complex image before comparing the modified first complex image with the second complex image **(Element 8 Fig 2)**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-23,27-29,33-37,42-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zach in view of Chuche et al. (US 6262818) hereafter Chuche.

14. Regarding Claim 21, Zach discloses the method of claim 18. Zach further discloses mean value at **(Col 3 Lines 11-13, Col 5 Lines 10-12 and Col 4 Lines 37-39)**. Zach is silent and does not disclose wherein comparing the modified complex image with the second complex image comprises determining a variance of a modulus of a ratio of the modified complex image and the second complex image.

Chuche discloses comparing the modified complex image with the second complex image comprises determining a variance of a modulus of a ratio of the modified complex image and the second complex image at **(Col 23 Lines 24-37 sum modulus difference)**. Chuche discloses that the system is robust and the phase aberrations are corrected digitally at **(Col 2 Lines 66 through Col 3 Lines 1-3)**. Both Zach and Chuche are analogous art and are from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to have used the teachings of Chuche in the method and system of Zach for the above reasons.

15. Regarding Claim 22, Zach and Chuche discloses the method of claim 21. Chuche further discloses wherein determining the aberration correction value comprises selecting the ratio having the smallest variance between the modified complex image and the second complex image at **(Col 21 Lines 13-38)**. Zach also discloses the differences between the measured values for the over focused and under-focused image are determined with section angle w and in the aberration free case the differences would disappear (smallest variance) at **(Col 4 lines 18-22)**.

16. Regarding Claim 23, Zach discloses the method of claim 18. Zach discloses first and second images, however is silent and does not recite wherein the first and second complex images comprise holographic images.

Chuche discloses wherein the first and second complex images comprise holographic images at **(Fig 1 Elements 4,5 and Col 6 Lines 26-46)**.

17. Regarding Claim 27. See the explanation of Claim 21.

18. Regarding Claim 28. See the explanation of Claim 22.

19. Regarding Claim 29. See the explanation of Claim 23.

20. Claim 33 is a corresponding system claim of Claim 21; therefore see the explanation of Claim 21.

21. Claim 34 is a corresponding system claim of Claim 22; therefore see the explanation of Claim 22.

22. Claim 35 is a corresponding system claim of Claim 23; therefore see the explanation of Claim 23.

23. Regarding Claim 36, Zach discloses the system of Claim 30. Zach further discloses a detector and recorder for producing the images and is silent and however does not disclose wherein the digital recorder comprises a CCD camera.

Chuche discloses wherein the digital recorder comprises a CCD camera at **(Col 11 Lines 40 –52)**.

24. Regarding Claim 37, Zach disclose discloses a system of claim 30. Zach is silent and however does not disclose further comprising a beam combiner optically coupled to the digital recorder, the beam combiner operable to receive a reference beam and an object beam to generate the first and second complex images.

Chuche further disclose comprising a beam combiner optically coupled to the digital recorder, the beam combiner operable to receive a reference beam and an object beam to generate the first and second complex images **(Col 6 Lines 36-37)**. Also see **(Figs 1,2a-2d)**.

25. Regarding Claim 42, See the explanation of Claim 21.

26. Regarding Claim 43, See the explanation of Claim 22.

27. Regarding Claim 44, Zach discloses the method of claim 38. Zach discloses obtaining a sharp image free from the aberrations at **(Col 3 Lines 25-26)**, however is silent and does not disclose further comprising applying a low pass filter to a ratio of the modified first complex image and the second complex image to obtain the low frequency ratio.

Chuche discloses applying a low pass filter to a ratio of the modified first complex image and the second complex image to obtain the low frequency ratio at **(Col 8 Lines 54-67 and Col 9 Lines 1-15)**. Cuche discloses that the Fourier filtering image processing can be done before **(and/or)** after the numerical reconstruction of the hologram at **(Col 8 Lines 54-67)**.

28. Regarding Claim 45, Zach and Cuche discloses the method of claim 44. Zach discloses further comprising calculating a Fourier transform **(Fig 2 Element 8)** of the ratio of the modified first complex image and the second complex image in order to apply the low pass filter in a frequency domain. Chuche discloses applying a low pass filter to a ratio of the modified first complex image and the second complex image to obtain the low frequency ratio at **(Col 8 Lines 54-67 and Col 9 Lines 1-15)**. Cuche discloses that the Fourier filtering image processing can be done before **(and/or)** after the numerical reconstruction of the hologram at **(Col 8 Lines 54-67)**.

29. Regarding Claim 46, Zach and Chuche discloses the method of claim 45. Zach further disclose comprising calculating an inverse Fourier transform of the low frequency ratio **(Fig 2 Element 5)** in order to modify the second complex image in a time domain.

30. Regarding Claim 47, see the explanation of Claim 23.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information

Art Unit: 2624

for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jayesh A Patel/
Examiner, Art Unit 2624

/J. W./
Supervisory Patent Examiner, Art Unit 2624